AN ASSESSMENT OF ALTERNATIVES FOR MANAGEMENT OF UPLAND HABITATS AT THE BROWNS PARK NATIONAL WILDLIFE REFUGE

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Browns Park National Wildlife Refuge

U. S. Fish and Wildlife Service

Department of the Interior

UNITED STATES FISH AND WILDLIFE SERVICE

REGION 6

Environmental Action Memorandum

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act and other statutes, orders, and policies that protect fish and wildlife resources, I have determined that the action of **implementing the Prescription Management - Including All Tools Alternative of Upland Habitat Management at Browns Park National Wildlife Refuge** is found not to have significant environmental effects as determined by the attached Environmental Assessment and Finding of No Significant Impact and is therefore authorized to be implemented.

Jane L. Gamble
Refuge Manager

7-18-94
Date

Bonnie W. Schranck
Associate Manager, Zone 1

9/2/94
Date

FINDING OF NO SIGNIFICANT IMPACT

The Implementation of the Prescription Management - Including All Tools Alternative of Upland Habitat Management at Browns Park National Wildlife Refuge, Colorado

Based upon the analysis of the environmental assessment for Upland Habitat Management, I have decided to adopt the Prescription Management - Including All Tools Alternative for the management of upland habitats at the Browns Park National Wildlife Refuge. Other alternatives considered included the No Action Alternative and the Prescription Management - No Grazing Alternative.

The decision to adopt the Prescription Management - Including All Tools Alternative was made because it is most responsive to the purpose for which the refuge was established and is preferable to other alternatives in light of physical, biological, economic, and social factors.

I find that the proposed action will not have a significant impact on the human environment in accordance with Section 102 of the National Environmental Policy Act and in accordance with the Service's Administrative Manual 30AM 3.9B (2)(d) and conclude that an environmental impact statement is not necessary.

My rationale for this finding is as follows:

1. The proposed action will not impact endangered or threatened species.

2. The proposed action will not impact archaeological resources.

3. The proposed action has a positive impact on wetlands and floodplains.

4. The proposed action may have moderate negative impacts on the local economy due to limited livestock grazing. The No Grazing alternative would have an even greater negative economic impact as no grazing would be allowed and there would be a significant increase in refuge operating costs. The No Action alternative would not change or affect present socio-economic conditions.

5. There will be positive short and long term effects on the environment. This will occur through a reduction in soil erosion due to increased plant population density and growth, an increase in water quality due to a decrease in soil erosion, a greater ability to achieve all grassland management goals and objectives, and lead to an increase in grassland plant species

diversity. Wildlife will benefit due to improved habitat conditions, such as an increase in nesting cover and forage, and a decrease in wildlife-livestock conflicts.

Ralph O. Morgenweck
Regional Director
U.S. Fish and Wildlife Service
Denver, Colorado

9-13-94
Date

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I. PURPOSE AND NEED

A. Introduction

Establishment of Browns Park National Wildlife Refuge was approved by the Migratory Bird Conservation Commission on August 20, 1963 (U.S. Department of Interior 1967). While the refuge was not established as a mitigation refuge, its primary purpose is to provide wetlands to replace those lost by the construction of Flaming Gorge Dam and Reservoir located upstream. The wetlands and associated riparian areas are valuable to several waterfowl species. Other migratory birds, including neotropical migrants and endangered species (bald eagles (*Haliaeetus leucocephalus*)and peregrine falcons(*Falco peregrinus*)), and many other forms of wildlife are dependent upon this vital ecosystem. The refuge is also valued as a wintering area for large ungulates.

Prior to the establishment of the refuge, the area was utilized extensively by local cattle and sheep ranchers for grazing livestock. Historical accounts attest to this extensive use of the area from the 1850's until the refuge was established in 1965. Due to the relatively mild winters, the area was regarded as being valuable as a wintering area for livestock. From 1965 until the present, grazing and haying on the Refuge have been permitted as economic uses for forage resources which were "surplus to the needs of wildlife". Historically, livestock grazing has occurred annually during the dormant season and has been limited to cattle and horses. In 1988 a reduction in the grazing program was seen by Refuge management as necessary to provide additional nesting cover for waterfowl and other upland birds. An additional reduction in livestock grazing took place in 1993 to provide forage for an increasing wintering elk herd (*Cervus canadensis*)(U.S. Department of Interior 1994).

Since 1965, station monitoring has revealed substantial increases in noxious weed species such as giant whitetop (perennial pepperweed, *Lepidium latifolium* L.), leafy spurge (*Euphorbia esula* L.), salt cedar (tamarisk, *Tamarix ramosissima* Ledeb.), and Russian knapweed (*Acroptilon repens* L.). Spot treatment by mechanical mowing, prescribed burning, and chemical application have taken place since 1989. However, these applications have resulted in only limited control of these noxious weeds (U.S. Department of

Interior 1981).

It has been the recommendation of several wildlife habitat specialists and range ecologists that changes should be made in refuge upland habitat management to improve and maintain a healthy natural grassland community on the refuge (Hansen 1993, Kruse 1990).

B. Purpose of Action

The U.S. Fish and Wildlife Service proposes to initiate changes in the management of upland habitats at Browns Park National Wildlife Refuge to more effectively achieve the purposes and objectives of the refuge. This environmental assessment is designed to evaluate current management practices and two alternative actions for preserving the integrity of native grasslands and managing the other upland habitats. This is necessary to attain the habitat objectives that are designed to accomplish the major purposes for which the refuge was established. This environmental assessment is not intended to evaluate management actions in other habitats on the refuge; however, all habitats are described under "The Affected Environment".

The purpose of the refuge is to manage the area as "...an inviolate sanctuary, or for any other management purpose, for migratory birds..." 16 U.S.C. 715d (Migratory Bird Conservation Act). An additional purpose designates the area "...suitable for 1) incidental fish and wildlife-oriented recreational development, 2) the protection of natural resources, and 3) the conservation of endangered species or threatened species..." 16 U.S.C. 460k (Refuge Recreation Act) (U.S. Department of the Interior 1993).

C. Need for Action

To carry out the purposes of the refuge, goals and objectives have been developed for the Browns Park National Wildlife Refuge. Of several major goals for refuge management at Browns Park, two are focused heavily toward upland habitats: 1) migratory bird maintenance and production and 2) preservation of natural diversity. To achieve those goals the refuge has developed several objectives which relate to upland bird habitats as follows:

1) Maintain approximately 3,500 acres of native grasslands in good to excellent ecological condition to provide the seasonal life requirements of native birds. There is an additional 6,800 acres of native grassland intermixed with brush at higher elevation upland areas that should also be included within the upland management context.

2) Protect the integrity of the native grassland component of refuge uplands by preventing the plowing of native grasslands or its conversion to other habitat types.

3) Protect and enhance riparian areas for migratory birds.

4) Initiate actions which will reverse the spread of noxious weed species into native vegetative types.

Preservation and management of upland habitats at Browns Park is vital to achieve the purposes of the refuge. Uplands provide nesting cover for hundreds of shorebirds, waterfowl, songbirds, and raptors each year. Uplands also provide feeding habitat for many bird and other wildlife species at various life stages and during various times of the year. Good vegetative cover on uplands promotes the health and longevity of adjacent wetland habitat by filtering runoff and controlling erosion into wetland basins.

Following many years of annual dormant season grazing, the primary grassland management tool used, refuge grasslands are showing signs of decline. The primary reason for this decline is that invading noxious weed species, such as giant whitetop, Russian knapweed, leafy spurge, and salt cedar, are crowding out native grass species on many sites. Giant whitetop became widespread following the disturbance of soil, such as during the construction of refuge dikes and ditches as impoundments were established in the 1970's and 1980's. Reclamation efforts, in the form of re-seeding vegetation, may have prevented the considerable spread of whitetop. The other species most likely became established from seed sources on adjacent lands located above the refuge along Beaver Creek and the Green River.

There is a need to re-focus attention and effort toward refuge uplands and insure that this important portion of refuge habitat is effectively managed to achieve the refuge purposes and objectives. This assessment will cover all current permitted activities and other management actions which could be used to achieve habitat objectives for birds and other wildlife on the refuge uplands.

II. ALTERNATIVES

A. Summary of Management Alternatives

Several alternative actions for management of refuge upland habitats can be taken to achieve the purposes, goals, and objectives of the refuge. The following alternatives were

selected for further analysis and review.

No Action Alternative - Management of refuge uplands would continue as it has been practiced in recent years. Annual dormant season grazing would be the primary management tool employed. Control of noxious weeds and other exotic species would be at the same level as in the past. Chemical application and mechanical mowing would be limited to spot treatments of noxious weeds. Prescribed burning would continue to be used primarily to control emergent marsh vegetation.

Prescription Management - No Grazing Alternative - Technology in the form of chemicals, machinery, and prescribed fire would be used as needed to rejuvenate, stimulate, and reseed grasslands. Monitoring of habitat conditions and wildlife response would be conducted to document the effects of management actions.

Prescription Management - Including All Tools Alternative (preferred alternative) - Management of upland habitats would be conducted in accordance with prescriptions prepared in advance of the planned management action. All management tools would be considered when developing prescriptions for planned management actions. Management tools such as grazing, haying, and burning would be utilized to remove vegetation only if residual vegetation becomes so dense as to insulate the soil and block light penetration, thereby choking out new growth (Kirby et al. 1992). Noxious weed management would also justify utilizing one or more of the aforementioned management tools. The use of management tools will also be applied to manage vegetational successional stages to promote species diversity. The selection of the most appropriate tools would be based on their expected effectiveness in correcting problems observed during monitoring of habitats, as well as which tool would be most beneficial to refuge upland habitat and the ecosystem.

B. Discussion of Management Tools Available for Use

1. General. The tools which are available for use in upland habitat management are rest, prescribed burning, livestock grazing, and technology. Human creativity along with money and labor must be used to effectively employ these tools.

2. Effects of Rest. Rest, when used as a management tool, is defined as the removal or absence of other management tools, especially those tools which cause a significant change in

the structure of vegetation and condition of the soil surface. When tailored to complement other tools in management, rest periods are essential to revitalization and recovery after use of other management tools. Rest provides plants the opportunity to recover stored food reserves and reestablish root networks.

As with the use of any tool, prolonged rest produces changes in community composition and structure. In this part of the intermountain west, long term rest of grassland tends to result in a slow loss of native species diversity (Baker and Kennedy 1985), instability of populations, and reduced effectiveness of mineral and water cycles (Savory 1983). Standing dead vegetation shades and reduces the vigor of new vegetative growth. Fewer new seedlings become established while mature plants produce less seeds and become a higher percentage of the plant population. Wider plant spacing develops with communities of algae, moss, and lichen often occupying the spaces between grasses. These spaces may also be bare ground or covered with a mat of weathered dead vegetation from years past. Rest often results in increased use by some wildlife species which are adapted to the conditions presented by rest.

3. Use of Rest. Rest can be used to provide residual standing vegetation for use by wildlife as nesting, roosting, bedding, feeding, fawning, and escape cover. The amount of rest used on refuge uplands would likely result in some areas having a reduction from maximum annual potential plant growth overall. This would be an acceptable trade-off to maintain the residual cover desirable for wildlife purposes. Rested areas should be as closely monitored as areas being actively manipulated. When monitoring shows a decline in vegetative successional level, considerations should begin for employment of a manipulative tool. Rest will be planned and monitored by refuge staff.

4. Effects of Fire. Fire probably has the most severe immediate effect on habitat and wildlife of any tool except plowing, and yet it can have some of the most positive effects as well. Both prescribed burning and wildfire expose the soil, may kill or reduce the vigor of some plants, invigorate some grass plants and woody shrubs, and quickly cycle mineral nutrients from organic to inorganic states by converting surface mulch, plant litter and standing growth to ash. By controlling the severity of the burn (i.e., amount of vegetation and soil organic matter consumed by fire), these effects may be managed during a prescribed fire. Exposure of the soil has the potential to increase erosion and run-off of precipitation, increase soil moisture evaporation, and increase the extremes of soil surface temperature and moisture. Fire usually produces

large amounts of smoke and particulate which may have an effect on downwind interests. However, smoke management is generally not recognized as a problem within the Browns Park area due to its relative isolation.

Depending on the timing, fire may kill wildlife, destroy nests and deny the use of the area by wildlife during a period of recovery. It can also open an area to increased wildlife use by attracting grazing species to succulent regrowing plants. Burned areas often result in an increase in invertebrate populations providing improved feeding areas for migratory birds (pers. com. A. M. LaRosa 1994). Frequent burning reduces grass and forb seedling establishment and increases moss and algae communities. Frequent burning can also reduce soil fertility and organic content.

5. Use of Fire. Careful consideration of fire effects must be made to ensure that its beneficial effects on the ecosystem outweigh the disadvantages. Burning would be most often used to control invading brush species and to open up emergent vegetation areas in marshes. Because burning tends to increase the loss of soil moisture, it is used primarily when there is sufficient soil moisture to support a quick regrowth of vegetative cover. There are usually adverse effects of grassland burning on ground nesting birds in the years that the burns are conducted. The most dramatic adverse affect is the temporary loss of nesting cover for ground nesting birds. To the maximum extent possible, burns will be properly timed to avoid the nesting period. Most early spring nesting species will usually renest if their first nest is destroyed by fire. The lack of available cover may cause species to avoid nesting in a burned area because of their increased exposure to predators.

Fire can be a useful tool in certain circumstances. It can be used when and where needed for specialized purposes or when other tools cannot be effectively used to accomplish the management objectives in a habitat unit. Burning may be used to reduce wildfire danger by removing accumulated heavy fuels, to remove heavy thatch that is reducing vegetative productivity and regrowth, and to prepare areas for other treatments such as interseeding. It may also be used in concert with other tools to reduce the density of exotic invaders and shrub species. In terms of ecosystem management, fire can be utilized to maintain a variety of successional stages to promote species diversity. Specifically, fire is the most effective management tool for reducing shrubs such as black greasewood (*Sarcobatus vermiculatus* (Hook.) Torr.) and silver sagebrush (*A. cana* Pursh) which are considered climax species. Reducing these shrub species would open areas to more desirable grassland

species which would be beneficial as wildlife forage and nesting habitat.

Fire would be planned, monitored, and controlled by refuge staff using refuge resources and equipment. The refuge's Fire Management and individual unit burn plans would be the primary documents guiding actual conduct of prescribed burns. The instructions and directions contained in those documents will not be duplicated here.

6. Effects of Grazing and Animal Impact. Grazing, as considered here, also includes animal impact. Animal impact is actually a separate tool which can be used to achieve effects on habitat different than those of grazing. However, because the two tools are normally employed together, they will be considered together here. Grazing, the clipping and removal of leaf from grasses and forbs by large domestic herbivores, tends to maintain the vigor of perennial grasses and their root systems, increase the total production of both above- and below-ground plant parts, prevent the premature death of the plants, and speed the recycling of nutrients.

Animal impact includes all the things that animals do while present on grasslands except grazing. It encompasses the trampling, walking, running, rubbing, dunging, urinating, and herding that occurs while animals are present. Animal impact breaks and causes irregularities on bare or exposed soil surfaces, returns plant material to the soil surface to cover it, and compacts the soil underneath the surface. It is a very complex tool which has major effects on water and mineral cycles and on plant succession. Animal impacts can either improve or weaken these foundation blocks of the ecosystem, depending on how and when it is employed (Savory 1983).

Animal impact is normally used as a tool in conjunction with grazing although it can be employed without grazing. The impact of livestock on the range can be used to break up capped soils, return plant material to the soil in the form of dung, urine, and plant litter, assist in establishing new plant seedlings, compact the soil surface and increase natural diversity. Water and mineral cycles tend to improve and succession tends to advance with proper use of high animal impact (Savory 1983).

In some locations, animal impact can be more important to grassland objectives than grazing. In such cases this tool may be used to replace fire as the tool of preference. In sites where a heavy build-up of standing or lodged dead vegetation has accumulated, high intensity, short duration dormant season grazing may be used to return plant material

to the soil surface, increase grass seedling establishment, and cover bare areas of soil with plant litter. It may also be used in areas of high club moss density to break up the moss and stimulate grass growth.

Depending on its timing, animal impact and grazing can be responsible in part for the introduction and spread of noxious weed species or can help to control them. Dormant season grazing does nothing to contribute to noxious weed control. However, high impact growing season grazing could contribute to noxious weed control by preventing the plants from going to seed. Continual high impact growing season grazing could contribute to a decrease in the stem density of noxious weeds. This method of grazing for the purpose of noxious weed control has had some short term success at other locations (Monte Vista National Wildlife Refuge, pers. comm. S. Brock 1993).

Grazing, which removes residual grass cover, tends to reduce the attractiveness of the habitat for some species of waterfowl, especially early nesting species that are dependent on residual grass cover for nesting. However, grazing could increase habitat attractiveness to late nesting waterfowl species such as blue-wing teal (*Anas discors*) and cinnamon teal (*A. cyanoptera*). These late nesting species prefer shorter grass that is in an active growing stage and as such are not dependent on residual grass cover.

The presence of large numbers of livestock may discourage the use of habitat by potential nesting birds and may occasionally trample nests. Implementing planned grazing with high animal numbers per acre must be closely monitored and time controlled to avoid impacting nesting species.

Overgrazing results when a grazed growing plant is regrazed before the shoots have sufficiently recovered from a previous defoliation. Overgrazing tends to weaken or kill the plant, cause distorted plant growth forms, reduce the plant's root system, slow down nutrient cycling, and expose the soil. Overgrazing is largely a function of the length of time grazing animals are present rather than the number of animals present. The more frequently a plant is grazed during its growing period, the more likely it will be effected by overgrazing.

Undesirable overgrazing is inherent with season-long use and long period rotation systems. Grazing periods should not exceed a few days in times of fast vegetative growth. On some sites planned overgrazing may be used to accomplish a specific objective such as encouraging a shift in plant composition from monotypic stands of noxious weeds to a more

diverse grassland community.

Livestock grazing, with controls on time and stock density, can be used to increase vigor of perennial grasses, increase production of vegetation, speed the recycling of nutrients, and prevent the decline and death of plants due to lodging and excessive build-up of old plant material. Grazing and animal impact can accomplish some of the beneficial effects of prescribed burning without leaving the soil so severely exposed. Grazing must be monitored, controlled and adjusted during the grazing period to ensure that the desired effects are accomplished.

Instead of fire, dormant season grazing may be the preferred tool in removing residual grass where fire damage to cottonwoods may be a concern. Livestock grazing over a short period of time would have fewer negative impacts on a cottonwood community than would prescribed fire in that cottonwood trees are extremely sensitive to damage by fire (Hansen 1994). Livestock grazing could also be damaging to a cottonwood community by such actions as browsing and trampling, hence the need for short duration grazing, limiting the exposure of livestock to cottonwoods. Quite often weather conditions are not conducive to burning. Livestock grazing is not dependent upon uncontrollable environmental conditions, such as proper relative humidity or wind direction and speed, to achieve specific management goals.

During the dormant season, especially during winters that are considered moderate to severe, domestic livestock directly compete with wintering elk for available forage. This wildlife-livestock conflict has become more of a problem in recent years due to an increase in wintering elk numbers on the refuge. There has been a steady increase in the number of elk in State Management Unit 201 which encompasses part of the refuge. This can be attributed to a high winter survival rate due to several successive relatively mild winters. Off-refuge forage available to wintering elk is limited due to domestic livestock grazing and haying operations.

7. Use of Grazing and Animal Impact. Grazing would be used to achieve an overall improvement in natural plant diversity and wildlife habitat condition throughout the refuge. Livestock grazing will be used to achieve the following effects on refuge grasslands when monitoring and planning indicates it will be the best tool for effecting needed changes:

- To remove or reduce heavy accumulations of thatch which is beginning to choke out regrowth of perennial plants

and woody riparian species.
- To aid in establishing new seedlings and/or stimulating existing plants to increase seed production.
- To reduce the growth, vigor, or spread of undesirable plants.

The 1987 Average Forage Production Survey indicated that all refuge grasslands could sustain a total of approximately 3,350 animal unit months (AUMs) of grazing annually (Cook 1987, Berlinger 1987). However, this AUM level does not currently represent forage that could be considered surplus to the needs of wildlife. This is due to a decrease in forage quality caused by the invasion (increase) of noxious weeds within native grassland areas. Additional forage is also required to provide for an increasing wintering elk herd. Furthermore, additional habitat in the form of residual cover for waterfowl nesting is required to maximize the potential of recent refuge wetland development. During planning, the AUM capacity of each site and the site capability to sustain grazing for the planned grazing period will be determined. Grazing would not necessarily be conducted annually. If a grazing prescription is warranted, grazing would not exceed 10 to 20 percent of refuge grasslands unless a special need arises. This level of grazing recognizes that not all grasslands would be in top condition for waterfowl nesting every year. Just as burning temporarily reduces or eliminates nesting from a treated area, grazing would also have some short term negative effects. These effects include removal or reduction of vegetative structure making the area less attractive as nesting habitat for some species. The presence of livestock during nest initiation may also discourage use of the area by some birds.

When it is determined through monitoring that an area of refuge grasslands is in need of grazing to achieve grassland management objectives, a grazing prescription will be prepared. The prescription would be similar in format to the plans prepared for prescribed burning. The grazing prescription would describe the area to be grazed, dates of use, class and numbers of livestock to be used, animal unit months of forage to be utilized, expected effects on vegetation and wildlife and other necessary information regarding pre- and post-graze monitoring.

Grazing periods would not be restricted to the summer season. Fast growth of some cool season plants begins as early as April 1. By delaying grazing until late spring, much of the potential for management of these cool season species is lost. Fast growth for warm season species begins about May 1 with slow growth commencing about July 1. The growing season ends about September 15 with the first fall

freeze. Dormant season runs from September 15 to April 1 although some slow growth of cool season species occurs in early fall and late winter. However, the extremely variable weather of northwestern Colorado can radically shift these dates from year to year by as much as four to six weeks.

Livestock used for grazing would be cattle owned by local stockmen. Grazing permits (form 3-1383) would be issued in accordance with the provisions of 5 RM 17.11C. Planning would be accomplished jointly by refuge staff and permittees.

8. Effects of Technology. Technology, as considered here, includes all the inventions of human culture such as chemicals, fencing, water developments, haying, plowing, reseeding, fertilizing, mowing, and the implements to accomplish or apply these things.

In the application of other tools to ecosystem problems, there is reliance on interrelationships within the ecosystem to accomplish a planned effect. Technology is often used to directly change succession, water and mineral cycles, or energy flow. It tends to be expensive in terms of dollars, fossil fuel, and human effort expended and is often employed to provide a quicker fix than can be expected from other tools. Technology is sometimes required to repair or recover from its misuse in the past.

Chemical herbicides are very effective in killing some species of plants but may have dangerous side effects on both human applicators and non-target biological resources if improperly applied. All pesticides must be reviewed at the Regional level and are approved only when other control methods are shown to be ineffective.

Fences are required to retain livestock in areas to be grazed and to exclude them from areas to be rested. The entire refuge boundary is currently fenced except the southwest corner which is too rocky to practically fence. Interior fencing includes 14 separate refuge units and ten water gaps. Fences can be visually intrusive on the landscape and a barrier and hazard to both birds and mammals if appropriate consideration is not given to fence type and placement. Temporary or single-strand electric fence would be used whenever possible to reduce those adverse impacts.

Mowing and haying can be used in some situations to knock down or remove fine fuels to reduce wildfire danger and to stimulate regrowth of new vegetation where it has been choked out by excessive accumulations of duff. Mechanical mowing is currently used in combination with chemical applications to control noxious weeds. To avoid adverse

effects on ground nesting birds, haying and mowing must be delayed until after July 15 in this area. Haying has some residual negative effects on early nesting waterfowl in the first year following harvest. For example, northern pintails (*Anas acuta*) and mallards (*A. platyrhynchos*) often initiate nests before significant regrowth of vegetation can occur.

Plowing has many detrimental effects on both habitat and wildlife. In this area, where drought is frequent, a plowed area may be unavailable to most wildlife for two or more years. Plowing is costly in labor, machinery, and fuel. It requires that the area be reseeded, which is also very costly. Before vegetation can be re-established, the soil is exposed to both water and wind erosion and is subject to invasion by noxious weed species. In some situations plowing may be needed to control certain plants when other tools are not appropriate.

Seeding would normally be conducted after an area has been plowed to reestablish permanent plant cover. Seeding activities alone would normally have minimal effects on wildlife because the operation is conducted prior to the growing season on sites that have been manipulated by other management actions.

Ripping and scarifying can be a useful tool to loosen compacted soil and stimulate plant growth without destroying the plant diversity of the site. Plant response is usually rapid to this type of disturbance and usually results in changes in the composition of species occupying the site. However, this change in species composition could reflect an increase by invading exotic weed species. Heavy deep chiseling has the potential to adversely affect archaeological resources that are located on or near the surface. Scarifying grasslands using light spring loaded tools can effectively disturb and scatter dead vegetation without disturbing subsurface artifacts.

9. Uses of Technology. Technology would most often be used to assist in employing other tools. It would primarily be in the form of refuge equipment, fences, and other improvements. These would be utilized when guidelines indicate that the technology being considered for use would be ecologically and economically sound. The use of pesticides may be required in certain circumstances to abide by state laws and as a part of integrated pest management but would be de-emphasized to the maximum extent possible. Technology in the form of mechanical mowing has been utilized in concert with pesticide use for controlling noxious weeds on the refuge since 1988.

Technology would be used to directly accomplish management objectives. Some areas of former croplands planted to smooth brome grass and legumes may be hayed, plowed up, spiked, inter-seeded, reseeded, or otherwise manipulated to stimulate, rejuvenate, and increase diversity of native plant species on the site. These methods of habitat manipulation can be expensive in terms of both economics and wildlife production. For this reason, these methods of habitat improvement should be carefully evaluated and used only when other tools would not be effective or cannot be used.

A substantial amount of conventional fencing is present on the refuge. Some additional interior fences would be required if grazing were conducted during the growing season for the purpose of noxious weed control or other rangeland improvement practices. However, it is expected that most of the new interior fencing required would be temporary or "lay-down" electric fences that would not be as visually intrusive or the long term barrier and hazard to wildlife movement that barbed wire fences present.

10. Planning. Planning is an effort of human creativity and labor. Because of its importance to the success of any management effort, it is briefly discussed here for additional emphasis.

Beginning with the 1995 management year, an annual habitat management report and plan will be prepared by refuge staff. This two part effort would be similar to the annual water management report/plan which has been prepared by the refuge for many years. The report would summarize the habitat management efforts of the past year. The plan would include anticipated activities which would affect refuge upland habitats in the coming year such as grazing, burning, seeding, or any other upland habitat management activity (see section IV. part C. Prescription Management - Including All Tools Alternative). For this effort to be successful, refuge staff would be required to monitor conditions in habitat units throughout the refuge and be able to propose and justify the use of management tools to achieve refuge objectives.

To provide guidance and simplify this planning effort, a biological plan and control matrix would be used. The chart would provide for control and management of the many details which arise in organizing a complex plan.

C. Alternatives for Management of Upland Habitats

1. General. The establishment of a National Wildlife Refuge carries a commitment to provide certain levels of resource

management. Management objectives are the means by which the Service ensures that activities and programs on National Wildlife Refuges are responsive to and consistent with the purposes and objectives of that refuge. The Service provides management objectives (see section I. part C. Need for Action) to which each alternative must be balanced against to determine whether it meets the minimum needs for preservation and enhancement of wildlife resources.

Detailed management plans are developed to provide on-site guidance and direction to ensure that objectives are achieved. An analysis of the alternatives was made by the Service and the Prescribed Action Alternative was selected as it most closely meets all objectives. Table 1 displays a summary of consequences of each of the alternatives.

Management of National Wildlife Refuges must comply with existing laws and regulations and adhere to sound resource management principles. Therefore, certain management policies based on these laws and principles apply to all of the alternatives. Following is a discussion of several legal and policy requirements which would be observed under each alternative.

a. Cultural Resources. Cultural resources on the refuge, both historic and prehistoric, will be protected from damage in accordance with the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470). They will either be preserved at the original location or excavated, recorded and preserved in a museum facility for future reference and study. Every effort will be made to preserve those sites of known or suspected importance. In addition, when new developments or management actions are planned which have the potential to disturb such sites, the area will be examined for any sites that might be impacted. If found, such sites will be preserved in the aforementioned manner.

b. Endangered Species. The proposed action is not likely to affect any federally listed endangered species. Bald eagle use is limited to the riparian areas only during the winter months. Peregrine falcons are not dependent on upland grasslands and would be unaffected by grassland management practices. The four species of endangered fish found on the refuge are limited to the Green River and would not be affected by the proposed upland management practices. If it is determined in the future that the implementation of any management plan developed under the guidance of this assessment may affect any threatened or endangered species, formal Section 7 intra-Service consultation will be requested beforehand as required by the Endangered Species Act of 1973 (16 U.S.C. 1531-1543)(see attached Section 7).

State-listed threatened and endangered species and species of special concern will also be protected. Inventories will be conducted to determine the presence of these species and actions will be taken to benefit these and other important state species.

c. Predator Management. After a three year study of the effects of predator control on the nesting success of upland nesting birds, predator control was discontinued. Predator control at Browns Park National Wildlife Refuge had an insignificant impact on increasing upland bird nesting success. Predator management was implemented during a three year period (1990-1992). Nest searches were conducted during 1990 and 1991. Average nest success (Mayfield exposure method) was 34.7% in both the trapped and untrapped units (Gamble 1992). Very few predators were trapped for the amount of effort that was expended. Predator management is currently not a concern regarding any of the three management alternatives. While predator control is currently not a concern and is deemed to be ineffective, changing predator composition and population numbers in the future may necessitate the need to reexamine this policy.

d. Native Grassland Protection. The U.S. Fish and Wildlife Service has a longstanding policy prohibiting the conversion of refuge native grassland habitats to other upland types or conditions such as cropland (6 RM 5.1). Native grasslands disturbed as a result of construction or other management actions must be rehabilitated using native species. Policy regarding native grassland management will be followed concerning any of the three management alternatives.

e. Refuge Compatibility. According to the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd), uses of National Wildlife Refuges are permissible when "compatible with the major purposes for which such areas were established." These uses must not materially interfere with or detract from refuge purposes (5 RM 20.6). Major actions are discussed with others before the final decision on a compatibility issue is made by the Service.

f. Refuge Management Plans. Management Plans contain detailed directions and procedures for accomplishing refuge objectives. When the refuge Upland Habitat Management Plan is prepared, the Service will offer the public and other Federal, State, and local agencies an opportunity to participate and comment in the planning and decision making process.

g. Aesthetic Resources. The National Environmental Policy Act of 1969 (NEPA) requires agencies to consider aesthetic impacts of proposed Federal actions, including scenery,

noise, and odor. The Service will preserve and enhance aesthetic resources to the extent that Refuge objectives can still be fulfilled. A natural undisturbed appearance is the visual standard that applies to refuge habitat rehabilitation and management projects. If this standard cannot be met, actions will be taken to mitigate or diminish any negative impacts.

2. **No Action Alternative.** The current regime of upland habitat management would continue under this alternative. Annual dormant season grazing would be the primary tool for grassland management. Currently 1,340 AUMs are authorized annually during the period of December 1 thru March 31. In 1993, this level of grazing reflected 335 cattle over an area of 3,643 grassland acres (35% of entire grasslands). Monitoring of grassland habitats would be minimal, limited primarily to long interval (10-20 years) ecological site condition surveys. Fire management on native grasslands would be limited to occasional wildfires which would be suppressed as quickly as possible. Prescribed burning would continue to be used primarily to control emergent marsh vegetation. Weed control would be continued as previously practiced in order to comply with legal requirements. Chemical application and mechanical mowing would be limited to spot treatments of noxious weeds. Increases in the acreage of noxious weeds and their spread into new areas would likely continue.

3. **Prescription Management - No Grazing Alternative.** Under this alternative the upland habitat management plan would preclude the use of grazing. Rest, chemical and mechanical treatments, and prescribed fire would be the only tools available to manage upland habitats. An upland habitat monitoring plan would be prepared to track the condition of refuge uplands. Monitoring would look for indications of a shift away from expected wildlife use and plant composition for the site. When there was a need for action on a tract to better accomplish refuge objectives, an evaluation would be conducted to determine what action to take to return the area to the ecological condition which would accomplish those objectives. Fire would be used more often in this option than would other management tools. Prescribed burning would be conducted under the constraints of Service policy and the refuge Fire Management Plan. Wildfires would be suppressed to prevent loss of refuge facilities, cultural resources, cottonwood galleries, and private and public resources on adjacent lands. On native grasslands, mechanical treatment would be closely evaluated to ensure that the Service policy regarding conversion of native grasslands is observed. Chemical pest control in the context of integrated pest management would continue to be used upon review and approval of the Pest Review Committee

and the Regional Office.

4. **Prescription Management - Including All Tools Alternative (preferred action alternative).** All management of refuge uplands would be by prescription to improve habitat conditions to achieve refuge purposes and objectives. Management of uplands would include the use of all tools available. A monitoring plan would be prepared to observe the condition of refuge habitat and the wildlife response to management actions. Monitoring techniques would include collecting information on vegetative height and density (visual obstruction (Robel) readings), plant canopy cover, frequency, and composition (Daubenmire vegetative surveys), trends in vegetational cover (photo points), and monitoring response by wildlife (duck nest searches, Mayfield success indicies, and wildlife population surveys). When monitoring indicates that action is needed on a tract to improve habitat in order to better accomplish the refuge purposes and objectives, a plan (prescription) will be prepared specifying: 1) a description of the tract location and size, 2) what the problem(s) is in the tract, 3) what the objective(s) is for the management action, 4) which tool(s) is to be used to achieve the objective(s), 5) how this tool(s) will be employed, 6) the timing, duration, and the extent of the management action(s), and 7) a monitoring schedule to track the effect of the action(s). This management prescription need not be elaborate and detailed. A two to three page form will be developed for this purpose. Post-treatment monitoring will be conducted in accordance with the habitat monitoring plan to determine the effects of the action. This will build a record of experience for each management tool which will ensure the most successful tools that will alleviate the problems and provide beneficial habitat will be used. Successful tools will be reconsidered when another prescription is necessary to produce desired habitat conditions for wildlife.

No grazing will be done on the refuge during the dormant season effective the winter of 1994. The refuge will be monitored for specific responses by wildlife over the next several years. Dormant season grazing will not be reinstated until such time as it can be demonstrated through monitoring that grazing can be used to benefit wildlife. Limited grazing will be implemented to enhance habitat for wildlife or for experimental whitetop control. The impacts of grazing will be closely monitored to evaluate the response by wildlife and the impact upon the noxious weed giant whitetop. Prescription burning will be limited to heavily vegetated marsh and associated upland units for the purpose of improving habitat for migratory birds and wintering elk. There may be periods when cattle may be effectively used in place of fire for this operation.

Critical riparian areas supporting cottonwoods, willow, and shrub understories (natural as well as reestablished), will be managed through long term rest and will not be burned or grazed without further evaluation. Weed control will be done utilizing the integrated pest management approach, which will allow for use of a combination of mechanical and chemical treatments, fire, biological control, and grazing to control noxious weeds.

Management tools such as burning, grazing, long term rest, and integrated pest management will not necessarily be performed on an annual schedule. These practices will take place based on demonstrated need (based on monitoring results) for management intervention. On-going monitoring will determine if and when a prescribed action is warranted and which tool(s) is to be used. Regarding the use of management tools, it would not be expected that any more than 10-20% of refuge uplands would be affected annually by any combination of management tools.

III. THE AFFECTED ENVIRONMENT

A. Location and General Description

Browns Park National Wildlife Refuge is located in an isolated mountain valley in extreme northwestern Colorado (see Appendix A). It lies along both sides of the Green River, entirely within Moffat County, 25 miles below Flaming Gorge Dam. The Utah-Colorado state line delineates the western boundary. To the south it shares a mutual boundary with Dinosaur National Monument. The remainder of the refuge shares mutual boundaries with Bureau of Land Management. The refuge is 53 miles northwest of Maybell, Colorado, on Colorado State Highway 318, 50 miles northeast of Vernal, Utah over Diamond Mountain, and 95 miles south of Rock Springs, Wyoming via Moffat County Road 10N and Wyoming State Highway 430 or 70 miles via U.S. Highway 191 and Clay Basin, Utah. Elevations vary from 5,355 to 6,200 feet above sea level. The refuge contains a total of 13,455 acres of river bottomland and adjacent uplands. Nine marsh units cover approximately 1,450 acres. River and sedimentary river bottomlands comprise approximately 1,000 acres. There are approximately 10,300 acres of grasslands interspersed with cottonwood (*Populus deltoides* Bartr. ex Marsh and *P. angustifolia* James) willows (*Salix* spp.), greasewood, and sage. The remaining acreage is alluvial benchlands and steep rocky mountain slopes. There is one private inholding on the refuge, a 207 acre tract of grassland and cottonwood groves located at the southeast end of the refuge used by the landowner as a winter forage area for cattle (U.S. Department of Interior 1994).

B. Climate

The influence of topography on weather is evident in Browns Park. The winters are unusually mild for mountainous country, thereby providing a winter haven for wildlife. The maximum temperature is usually about 90 degrees Fahrenheit and the minimum is about 20 degrees below zero. The growing season is fairly short, 84 days, with the average first killing frost in the fall about mid-September. The average annual precipitation (total snow and rainfall) is less than ten inches, most of which is received in the spring and fall. Average wind velocities are less than seven miles per hour, except during the spring, when gusts may reach 50 mph.

C. Geology of Area

There are three distinct land types on the refuge: steep, rocky mountain slopes, alluvial benchlands, and conglomerate sedimentary river bottomlands.

Alluvial benchlands and conglomerate sedimentary river bottoms are indicative of the effects of historical and present river channels that were important in creating the valley. The meandering of the river and its erosion of established banks and deposition of fresh alluvial materials creates bars, oxbows, and islands along the river. The erosional and depositional pattern of the Green River helps maintain the diversity of the floodplain plant communities.

D. Soils

A soil survey of Moffat County was completed in 1975. Browns Park Refuge contains 14 soil types. Upland soil types are characterized as being very deep and well drained. Typically these soils occur on 3-12 percent slopes within Sandy Cold Desert range sites. These soils were formed in alluvium derived from sedimentary rocks. Permeability of these soils is moderately rapid. Available water capacity is low. Run off is slow, and the hazard of water erosion is moderate. The hazard of soil blowing is high. Effective rooting depth is 60 inches or more. The potential plant communities on these soils are mainly: black greasewood, basin big sagebrush (*Artemisia tridentata* Nutt.), silver sagebrush, shadscale saltbrush (*Atriplex confertifolia* (Torr. & Frem.) Wats.), needle-and-thread (*Stipa comata* Trin. & Rupr.), western wheatgrass (*Agropyron smithii* Rydb.), bottlebrush squirreltail (*Sitanion hystrix* (Nutt.) J.G. Smith), thickspike wheatgrass (*Agropyron dasystachyum* (Hook.) Scribn.), Nevada bluegrass (*Poa nevadensis* Vasey & Scribn), sand dropseed (*Sporobolus cryptandrus* (Torr.) Gray), spiny hopsage (*Grayia spinosa* (Hook.) Moq.), and

Indian ricegrass (*Oryzopsis hymenoides* (R. & S.) Ricker). The annual average production of air dry vegetation ranges from 662-725 pounds per acre.

Bottomland soils found within the Green River floodplain are typically at 0-3 percent slopes within Cold Desert Overflow range sites. These soils are deep, moderately well drained and formed from alluvium derived from various sources. Permeability of these soils is moderate. Available water capacity is generally high. Runoff is very slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. The hazard of flooding is rare. Effective rooting depth is 60 inches or more. The potential plant communities on these soils are mainly: basin wildrye (*Elymus cinereus* Scribn. and Merr.), common reed (*Phragmites australis* (Cav.) Trin. & Steud.), alkali sacaton (*Sporobolus airoides* (Torr.) Torr.), western wheatgrass, fourwing saltbush (*Atriplex canescens* (Pursh) Nutt.), basin big sagebush, sandbar willow (*Salix exigua* Nutt.), and Indian ricegrass. The annual average production of air dry vegetation ranges from 1000-4200 pounds per acre (Soil Conservation Service 1992).

E. Water Resources

There are three sources of water used at Browns Park National Wildlife Refuge to fill impoundments, maintain riparian vegetation, and irrigate meadows to provide food, cover, and habitat for wildlife. The primary source of water is the Green River. Other water sources include two tributaries of the Green River, Beaver Creek and Vermillion Creek. Eight pumps located along both sides of the Green River are used to maintain eight of the marshes, covering approximately 1,440 surface acres. Diversions from Beaver Creek maintain another 110 acre impoundment and irrigate 45 acres of meadow. Diversions from Vermillion Creek supplement pumping efforts for maintaining the 145 acre Grimes Marsh Unit. The Refuge's water rights on the Green River totals 96 cfs (cubic feet per second), Beaver Creek 40 cfs, and Vermillion Creek 20 cfs.

F. Vegetation

1. Native Grasslands. The refuge contains approximately 10,300 acres of native grasslands. The primary species present are alkali sacaton and saltgrass (*Distichlis spicata* (L.) Greene) in areas that are in close proximity to the Green River. In the more well drained soils of the upland areas, needle-and-thread, Sandberg bluegrass (*Poa sandbergii* Vasey), bottlebrush squirreltail, and western wheat, are the most common native grass species. Annual vegetation yield varies significantly from year to year depending on

precipitation and range site. An Average Forage Production Survey conducted by Colorado State University and U.S. Fish & Wildlife Service personnel in 1987 showed same-site total plant production to vary from 662 pounds to 4,200 pounds per acre.

Some areas of the refuge have been seeded to non-native species or species not typically found within native grasslands of the intermountain west. Prior to refuge development, approximately 180 acres of smooth brome grass (*Bromus intermis* Leyss.) was seeded within meadow areas adjacent to Beaver Creek. Less than two acres of intermediate wheatgrass (*Agropyron intermedium* (Host) Beauv.) was seeded and became established following dike construction within the Grimes Marsh Unit. Cheatgrass (*Bromus tectorum* L.) has become naturalized in the area.

2. Riparian. The primary riparian objective is to increase woody plant diversity within refuge riparian zones. The effects of historical homesteading and high livestock use can be seen on the riparian ecosystem along the Green River. Especially evident is the lack of cottonwood and willow regeneration along with the associated understory plants such as rose (*Rosa* spp.), western serviceberry (*Amelanchier alnifolia*), snowberry (*Symphoricarpos* spp.), red-osier dogwood (*Cornus stolonifera*), common chokecherry (*Prunus virginiana*), currant (*Ribes* spp.), and gooseberry (*Ribes* spp.). Cottonwood stands were logged by homesteaders and impacted by livestock grazing long before the refuge was established. The vast majority of the present woody vegetation is a monoculture of mature, decadent, or dead growth stage cottonwoods. Annual flooding of backwater areas, which provided a decent seed bed and seed deposit along the river's banks, have virtually ceased with the development of the Flaming Gorge Dam, resulting in very little natural regeneration (Hansen 1993).

During the past two years, refuge personnel have attempted to supplement natural regeneration of cottonwoods by planting approximately 100 cottonwood cuttings. The success of these experimental plantings is yet undetermined.

3. Wetland Vegetation. Emergent marsh vegetation has become established since the construction of refuge impoundments. The most common emergent vegetation is hardstem bulrush (*Scirpus acutus* Muhl. & Bigel.) and cattail (*Typha* spp.) which are abundant in all nine marsh units. Several species of submergent plants, such as sago pondweed (*Potamogeton pectinatus* L.) and wigeongrass (*Ruppia maritima* L.) are found within the marsh units that hold deeper water. Some upland habitat management tools may affect the vegetation of adjacent wetland areas as water elevations vary from year to

year in those units (Kantrud 1990, 1991).

4. Endangered Plants. No extensive or systematic plant inventory has ever been conducted on the refuge. However, a candidate species for listing on the Federal Threatened Plant List, Gibbens' beardtongue (*Penstemon gibbensii* Dorn), was discovered during 1989 on the refuge. Three other populations (Sweetwater County, Sand Creek, and Flat Top Mountain, Wyoming) are known to exist. Only a few plants are found on steep white shale slopes, which are limited to only a few small sites, on the refuge (Dorn 1990).

5. Noxious Plants. Several species of plants included on Colorado's Noxious Weed List are found on the refuge. These exotic invaders tend to out compete and displace native plant species. Their value to wildlife is limited in terms of forage and cover.

The most widespread is giant whitetop (1,200 acres). Its habit of invading disturbed sites makes refuge shorelines, ditches, and dikes susceptible when receding water levels expose bare soil. Giant whitetop is distributed throughout the refuge and is most common where dike and ditch construction have occurred or where soil has otherwise been disturbed.

Russian knapweed (80 acres) and leafy spurge (3 acres) have also become established in several bottomland locations on the refuge. Vigorous efforts have been expended to contain and eradicate these two invaders.

Spot treatment utilizing chemicals, prescribed burning and mechanical mowing during the past four years have only been partially effective in controlling the spread of all three weeds. Other noxious weeds found on the refuge that may become a concern in the future include hoary cress (*Cardaria draba* (L.) Desv.), Canada thistle (*Cirsium arvense* (L.) Scop.), Russian olive (*Elaeagnus angustifolia* L.), and saltcedar. Currently, other than mechanical mowing, there is no refuge weed control management taking place for these species.

G. Wildlife

1. Endangered Species. The bald eagle and the peregrine falcon, species currently listed as endangered, are present on Brown Park National Wildlife Refuge. Bald eagles are present on the refuge during fall, winter, and spring months but do not nest on the refuge. Peregrine falcons are present during spring, summer, and fall months and nest immediately adjacent to the refuge. The Colorado squawfish (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), bonytail

(*G. elegans*), and razorback sucker (*Xyrauchen texanus*) are classified as endangered. These four species of fish are present within the section of the Green River which flows through the refuge (U.S. Department of Interior 1987).

Several other species of special concern use the refuge for either migration or breeding habitat. Species included are the long-billed curlew (*Numenius americanus*), white-faced ibis (*Plegadis chihi*), Ferruginous hawks (*Buteo regalis*), burrowing owl (*Althene cunicularia*), black tern (*Chlidonias niger*), and loggerhead shrike (*Lanius ludovicianus*). The river otter (*Lutra canadensis*) is another species of special concern that is a year round resident of the area.

2. Invertebrate Populations. Despite their importance, little is known about the populations or ecology of invertebrate species on the refuge. The slightly saline waters of the marshes produce huge quantities of midges (Chironomidae), mosquitoes (Culcidae), water boatmen (Corixidae), backswimmers (Notonectidae), *Daphnia* (Cladocera), amphipods, and others. The uplands also produce large numbers of insects and spiders. These invertebrates form the food base for almost all birds during portions of their life cycles on the refuge. Because of the important role of invertebrates in the lives of all refuge birds and other wildlife forms, management planning must consider potential impacts on the invertebrate community.

3. Fish. The Green River, which flows through the center of the refuge, is a popular sport fishery. Brown (*Salmo trutta*), cutthroat (*S. clarki*), and rainbow trout (*S. gairdneri*) are the species most sought after. Carp (*Cyprinus carpio*), catfish (Ictaluridae), and suckers (Catostomidae) are also present in the river. Beaver Creek supports a brook trout (*Salvelinus fontinalis*) fishery in the segment of the stream that flows through the refuge. Butch Cassidy marsh also supports a brook trout fishery during years when Beaver Creek flows (which are diverted into the marsh) are adequate to support sufficient wetland depths. Because of the shallowness of the refuge's other marshes and winter freezing, fish seldom survive from year to year.

There is also the possibility of endangered fish (Colorado squawfish, humpback chub, bonytail, and razorback sucker) occuring in the Green River.

4. Reptiles and Amphibians. Several species of reptiles and amphibians have been documented on the refuge but no comprehensive survey has been conducted. Tiger salamander (*Ambystoma tigrinum*), Great Basin spadefoot (*Scaphiopus intermontanus*), and the northern leopard frog (*Rana pipiens*)

are the more common amphibians. The short-horned lizard (*Phrynosoma douglassii*), sagebrush lizard (*Sceloporus graciosus*), racer (*Coluber constrictor*), and the Great Basin gopher snake (*Pituophis melanoleucus deserticola*) are the more common reptiles.

5. Birds. Of the 444 species known to visit Colorado, of which 267 have been documented to breed in the state, approximately 200 have been recorded at Browns Park National Wildlife Refuge.

Several species of colonial water birds have established breeding areas on the refuge. They include eared (*Podiceps nigricollis*), pied-billed (*Podilymbus podiceps*), and western grebes (*Aechmophorus occidentalis*), great blue herons (*Ardea herodias*), black-crowned night-herons (*Nycticorax nycticorax*), American bitterns (*Botaurus lentiginosus*), white-faced ibis, sora (*Porzana carolina*) and Virginia rails (*Rallus limicola*). Other species of waterbirds that use the refuge during the year include sandhill cranes (*Grus canadensis*), American white pelicans (*Pelecanus erythrorhynchos*), double-crested cormorants (*Phalacrocorax auritus*), Franklin's (*Larus pipixcan*), Bonaparte's (*L. philadelphia*), ring-billed (*L. delawarensis*), and California gulls (*L. californicus*), and black, Caspian (*Sterna caspia*), and Forster's terns (*S. forsteri*).

Shorebirds that utilize the refuge during migrations include American avocets (*Recurvirostra americana*), black-necked stilts (*Himantopus mexicanus*), willets (*Catoptrophorus semipalmatus*), long-billed dowitchers (*Limnodromus scolopaceus*), greater (*Tringa melanoleuca*) and lesser yellowlegs (*T. flavipes*), Wilson's (*Phalaropus tricolor*) and red-necked phalaropes (*P. lobatus*), marbled godwits (*Limosa fedoa*), long-billed curlews and several species of sandpipers (*Calidris* spp.). Killdeer (*Charadrius vociferus*), common snipe (*Gallinago gallinago*), and spotted sandpipers (*Actitis macularia*) nest along the river and marsh units as well as within refuge meadow areas.

Sixteen species of hawks and six species of owls have been documented on the refuge. Northern harriers (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), and great horned owls (*Bubo virginianus*) are the most common nesters. Turkey vultures (*Cathartes aura*), golden eagles (*Aquila chrysaetos*), and merlins (*Falco columbarius*) are also thought to nest on the refuge.

The full range of passerines common to the intermountain west are found on the refuge during some part of the year. Included are many neotropical species. Nesters include

mourning doves (*Zenaida macroura*), common nighthawks (*Chordeiles minor*), black-chinned hummingbirds (*Archilochus alexandri*), northern flickers (*Colaptes auratus*), three species of kingbirds (*Tyrannus tyrannus*, *T. verticalis*, and *T. vociferans*), Say's phoebes (*Sayornis saya*), six species of swallows (*Tachycineta bicolor*, *T. thalassina*, *Riparia riparia*, *Stelgidopteryx serripennis*, *Hirundo pyrrhonota*, and *H. rustica*), marsh wrens (*Cistothorus palustris*), mountain bluebirds (*Sialia currucoides*), western meadowlarks (*Sturnella neglecta*), numerous species of warblers, sparrows, and blackbirds (Emberizidae), and finches (Fringillidae).

Two species of nonmigratory birds are also present. These are chuckar (*Alectoris chukar*), an exotic species, and native sage grouse (*Centrocercus urophasianus*). One grouse lek was known to have existed on the refuge and was utilized for a period of several years. Young grouse have also been seen in other areas of the refuge in recent years probably indicating undiscovered leks.

The refuge is used by 25 species of waterfowl. A small number of tundra swans (*Cygnus columbianus*) use the refuge as a stopover during their spring and fall migrations. Trumpeter swans (*C. buccinator*) have been observed on rare occasions during fall migration. Canada geese (*Branta canadensis*) are year round residents. Approximately 300 goslings are hatched each year. During the fall and winter Canada goose numbers may reach up to 1000. Occasionally Ross' (*Chen rossii*) and snow geese (*C. caerulescens*) are also observed during their fall and spring migrations. Fifteen species of ducks nest on Browns Park National Wildlife Refuge. Gadwall (*Anas strepera*), mallards (*A. platyrhynchos*), cinnamon teal , northern shovelers (*A. clypeata*), ring-necked (*Aythya collaris*), and redheads (*A. americana*) are the most common nesters. Annual production averages approximately 3,500 ducklings from approximately 5,700 acres of uplands, dikes, and wetlands.

6. Mammals. Thirty-eight species of mammals have been documented on the refuge. All mammal species are year round residents with the following exceptions. Elk and mule deer (*Odocoileus hemionus*) reside at higher elevations during most of the year. However, moderate to severe winters force the animals to utilize lower elevation habitats such as the refuge. Moose (*Alces alces*) and two known bat species (*Myotis californicus* and *M. lucifugus*) utilize the refuge during warm season months. Bighorn sheep (*Ovis canadensis*) occasionally utilize the refuge during winter months.

Madsen (1989) conducted a small mammal survey during 1988 and 1989 comparing small mammal populations in the grazed

and ungrazed refuge units. Results from this survey revealed that ungrazed units supported more diversity of small mammals and more than ten times the number of small mammals as did the grazed units. It is well known that small mammals serve as an important prey base for many other species of mammals and birds.

H. Recreational Uses

Public use, in the form of fishing, wildlife observation, hiking, and photography, occurs year round. The refuge maintains two primitive campgrounds and an auto tour route. A hunting program is conducted on part of the refuge for waterfowl. Hunting for mule deer, elk, and cottontail rabbits (*Sylvilagus audubonii*) is allowed on all refuge land except within designated closed areas. All hunting is in accordance with regular state hunting seasons and regulations.

I. Cultural Resources

1. Prehistory and Archaeology. Excavations of Paleo-Indian materials, by groups originating from the Eastern Plains cultures, date occupation in the area to as early as 7000 B.C. After about 1600 B.C., artifacts are thought to come from people with Desert Culture traditions. Fremont cultures, as evidenced by projectile points and petrogylphs, used the areas as early as A.D. 650. At the time of Euro-American contact, the region was occupied by Comanche, Shoshoni and Ute groups. Blackfeet, Sioux, Cheyenne, Arapaho, and Navaho tribes also visited or used the area. Metates, petroglyphs, arrowheads, teepee rings, and corncribs found within the refuge area indicate evidence of a significant Early American presence (Science Applications, Inc. 1982).

2. Recent History. In 1776 the Dominguez and Escalante Expedition from New Mexico to the California missions came close to the Browns Park area. They noted that the Green River was the boundary between the Ute and Comanche tribes. By the 1805 Lewis and Clark Expedition, the area was occupied by Shoshoni and Utes. William Ashley and his band of fur trappers became the first whites recorded to actually set foot in Browns Park in May 1825. At that time he recorded several thousand Indians (probably Snakes, members of the Shoshoni) as having a winter camp on the west side of the Green River just above Vermillion Creek. The Peoria Party, which passed through the area on their way to Oregon in 1839, reported about 3,000 wintering Shoshoni. In 1839 Baptiste Brown (a French Canadian trapper who may be responsible for the naming of Browns Park) wintered in the valley with the Arapaho. Between 1826 and 1840, mountainmen

trapping beaver used Browns Park (or Browns Hole as it was then called) as their winter campground and spring rendezvous. During this period the area served as a major trade depot for the Native Americans and Euro-American fur traders and trappers. A few of them settled in the area and were joined by other settlers. In 1837 Fort Davy Crockett was built on present refuge property by Philip Thompson, William Craig, and Prewett Sinclair (Science Applications, Inc. 1982). Its purpose was to protect the settlers and trappers against Blackfoot Indians and to serve as a trading post (U.S. Department of the Interior 1967). Several white trappers left the area in 1839 because of fear of reprisal for an attack on the Sioux near the Little Snake River at the east end of Browns Park. As late as 1842 traders from Fort Davy Crockett traded with the Shoshoni, Ute, and Navaho. The fort was abandoned in the 1840's when most of the white residents in the area left after the breakdown of the Rocky Mountain trapping system. When John Wesley Powell boated down the Green River in 1869 and again in 1871 he too reported Indian use (Science Applications, Inc. 1982). Utes are known to have used the area well into the early 1900's (Kouris 1988).

As a direct response to the discovery of gold in California and the continued population growth there, the reputation of Browns Park as a favorite wintering area for cattle began to grow. Many Texas cattlemen wintered their herds in Browns Park enroute to the coast. W. H. Snyder arrived with his herd in the early 1850's. By the 1860's a large cattle industry had evolved in Colorado and Wyoming. Browns Park was used as wintering range by cattlemen and as a safe haven for outlaws and rustlers who preyed on the cattle herds. As many as 100,000 head were wintered in the area at one time (U.S. Department of the Interior 1967). Juan Jose Herrera, "Mexican Joe," started a cattle business in 1870 along the east edge of Browns Park by "acquiring a few head from every big outfit that passed through the park". George Baggs wintered 900 head of cattle in Browns Park during 1871 without losing one. The importance of the area as a good quality wintering ground grew. Jesse S. Hoy found the area occupied by over 4000 cattle the following winter. In 1873 Valentine Hoy and Sam and George Spicer started a spread with about 300 cattle. Between 1875 and 1880 three more Hoys arrived to begin their own ranches. Most of the settlers in the late 1870's and early 1880's settled on the Utah side of Browns Park (Tennent 1981).

In the 1870's the Middlesex Land and Cattle Company was developed in Clay Basin and its owner, backed by East Coast money, threatened to get rid of the little ranches in Browns Park. This caused the Browns Park ranchers to unite against this common enemy. To stop the Middlesex Company, local

ranchers went into the sheep business. Between the heavy sheep grazing, cattle rustlers, and a drop in cattle prices in 1884, Middlesex faced an uncertain future. During the winter of 1886-1887 Middlesex cattle starved to death and the large cattle company went out of business (Tennent 1981, Kouris 1988).

Browns Park continued to be used by small family cattle ranchers, who gave way to sheepmen in the 1920's. When the overgrazed range ceased to provide year-round feed, the stockmen gave way to a handful of farmer-ranchers who eked out an existence from the overgrazed land (U.S. Department of the Interior 1967).

The refuge grasslands have been grazed continuously during the dormant season since its establishment in 1965. However, not all grasslands were grazed every year; some grassland areas were subjected to rest each year. Grazing has ranged from a high of 3,275 AUMs (Animal Unit Months) in 1967 to 1,340 AUMs in the 1993-1994 winter grazing season. This reduction in grazing has been necessary to increase the amount of residual nesting cover for waterfowl and provide forage for wintering elk.

The Browns Park area is still recognized as an important wintering area for domestic livestock as well as wildlife. With regard to wildlife management considerations, the area is viewed as critical habitat for wildlife, especially during the more severe winters.

The concept of a wildlife refuge in Browns Park is not new. In 1906 C. M. Taylor moved into the Utah side of Browns Park. He saw himself as a conservationist and was active in creating better range with good management. He attempted to introduce quail and pheasants into the area. A small pond on his property was used by whooping cranes (*Grus americana*), herons, swans, and other waterbirds and was protected against hunters and other disturbances (Kouris 1988).

J. Social and Economic Aspects

Moffat County is the second largest county in Colorado with an area of 4,743 square miles. The 1990 census figure shows a population of 11,357 in the county. Over 8,000 people live in the county seat of Craig. Craig is the commercial and industrial center of northwestern Colorado. There are several coal mining operations and the largest power generation plant in Colorado within a few miles of Craig.

There are 2.5 million acres of Public Land in the county administered by the Bureau of Land Management, National

Forest Service, Fish and Wildlife Service, and the National Park Service. These areas provide recreational opportunities in the forms of hunting, fishing, hiking, camping, horseback riding, and off road vehicle use. These public lands also provide economic input in the form of cattle and sheep grazing, coal mining, timber harvest, hunting, and fishing.

Browns Park National Wildlife Refuge is visited by approximately 9,500 people annually. Most visitors are from Craig and Steamboat Springs, Colorado. The refuge's highest use comes in the fall during waterfowl and big game hunting seasons. Browns Park National Wildlife Refuge's contribution to the local economy is approximately $300,000 in the form of wages paid and goods and services purchased.

IV. ENVIRONMENTAL CONSEQUENCES

This section evaluates the environmental effects that can reasonably be expected from each of the Service's alternatives for management of upland habitats.

A. Effects of No Action Alternative

The current management system is one of minimal management activity. Current upland habitat management methods are having minimal adverse effects on soils and water. Erosion of soils from refuge uplands is minimal on most sites. Bare soil on some sites is subject to erosion during heavy rainfall or spring runoff events. Erosion is likely to remain at a very low level under this alternative. However, some erosion will continue due to the plant composition and densities not being at their optimal levels. Current annual dormant season grazing for the most part takes place when the ground is frozen resulting in minimal erosion problems. The percentage of bare soil on most sites would remain the same or increase slightly overall.

The native vegetative community is likely to continue to evolve under the current management scheme toward higher populations of plants which are adapted to the "minimal disturbance" regime currently being employed. Lack of surface disturbance during the growing season is likely to result in lower levels of seedling establishment and a larger component of plants in older age classes (Savory 1983). The expansion of noxious weeds is likely to continue at rates similar to those observed over the past 20 years resulting in reduced natural diversity (Baker and Kennedy 1985). Over the next 20 years this is likely to result in significant reductions in native plant populations on most upland sites.

Native grassland plants are relatively unaffected by annual dormant season grazing. However, long term dormant season grazing negatively impacts riparian vegetation by excessive browsing and trampling of non-target species. This would include such plants as cottonwood, willow, dogwood, and other desirable woody riparian species. Over the long term, continued expansion of noxious weeds, which have little wildlife habitat value, would result in reduced nesting by migratory birds. Negative short and long term effects on refuge wintering elk herds would result from continued annual dormant season grazing at current AUM levels.

There would be no effect on the refuge public use program. Cultural resources, economic factors, and social factors would remain unchanged and unaffected by the No Action Alternative.

1. Conclusion. This alternative will produce negative impacts on natural grassland diversity and on use of uplands by ground nesting birds because of continued increases in noxious weed species and lack of residual nesting cover. Annual dormant season grazing also results in a wildlife-livestock conflict as elk utilize refuge forage during moderate and severe winters. When wildlife benefits are the reason for a grazing program, there is little justification for continuous annual grazing of any type on most lands (Kirby et al. 1992).

Annual dormant season grazing at current AUM levels cannot be justified due to the following compatibility considerations: 1) Based on observations by current refuge management and grazing permittee, less forage (surplus to the needs of wildlife) is available annually due to the continual deterioration of native grasslands. This is caused mostly by an increase in the relative abundance of noxious weeds. 2) Recent wetland development projects require additional residual cover be made available to early nesting waterfowl species in an attempt to optimize wetland enhancement potential. 3) Additional grassland forage is needed to provide for an increasing wintering elk herd which is a recent phenomenon. 4) Annual dormant season grazing negatively impacts riparian vegetation and associated wildlife by decreasing plant species composition, diversity, vigor, and biomass (Hansen 1994).

B. Effects of Prescription Management - No Grazing Alternative

The exclusion of grazing as a management tool on refuge grasslands would require an imaginative and extensive use of mechanical methods to duplicate the positive effects that grazing can produce in managing upland habitats to achieve

refuge purposes and objectives and maintain a healthy ecological condition.

To prevent the expansion of certain noxious plants, higher levels of chemical herbicides and mechanical treatments would be required. Certain areas of near-monotypic stands of noxious weeds may be burned, chemically treated, or plowed to eliminate these exotic plants. This may result in some areas not being available for wildlife use during the conversion process. Treated areas would be replanted to native grass and forb species common to that ecological site.

To avoid complete removal of residual cover by tillage or fire, a site in need of treatment may be scarified using a rake, peg-toothed harrow, or drag of some type. This treatment can break up the accumulation of standing dead vegetation and return it to the soil surface. Removal of excessive amounts of dead material in clumps of bunch grasses stimulates the plants to more vigorous growth and seed production.

Uses of upland habitats by bald eagles, peregrine falcons, and species of special concern would be minimally impacted under this alternative during short time periods when management tools are being employed. However, the improved habitat conditions resulting in increased wildlife populations will also be beneficial to these species. Section 7 consultations will ensure that no activities will occur which may effect these species.

The improved ecological condition of uplands under this alternative would increase the attractiveness, species composition, structure, and diversity for a variety of native migratory species including northern pintails, mallards, and gadwalls. In the years when spring burning is conducted, nesting by these birds will be reduced or eliminated from the burned tracts and may be reduced the following year. Mechanical treatments would have minimal direct effect on birds or other wildlife if conducted during the late fall or winter.

Increased use of mechanical equipment is likely to cause some increased soil compaction and crushing of plants. The negative effects would be short term with the positive stimulative effects outweighing the negative, especially if conducted in the winter when the ground is frozen. It is not known whether mechanical treatments can be a fully effective replacement for well managed grazing in maintaining natural diversity in the intermountain western grasslands.

The most negative effect of this alternative would be the additional costs. Increased refuge labor and greater use of fossil energy to operate the mechanical equipment would be required. Although some funds could be reallocated from other refuge activities, increased levels of funding would be needed to effectively implement this alternative. Mechanical treatment of 20 percent of upland habitats annually at a cost of approximately $55 per acre (labor, materials, and equipment operating costs) would increase refuge operating costs by approximately $38,500 per year. Limited use of chemical herbicides (if approved by Regional office) would also add substantially to operating costs.

1. Conclusion. The Prescription Management - No Grazing Alternative could achieve most of the refuge objectives for upland habitat management and is compatible with the major purposes for which this area was established. However, this alternative is not recommended because of the need to use extensive and expensive mechanical and chemical treatments to reach those objectives.

C. Effects of Prescription Management - Including All Tools Alternative (preferred action)

This alternative is the most complex because it includes the use of all possible management tools. The effects of each tool is discussed in section III. Discussion of Management Tools Available for Use.

Effects on soils and water are expected to be favorable. Erosion would likely increase slightly in years in which a site is grazed or burned. However, the increased plant population density and plant growth stimulated by these tools will result in reduced erosion and higher water quality in the years following the treatment.

Plant response to more frequent disturbance by grazing and fire is likely to result in greater seed production, increased seedling establishment, greater plant density, and increased total vegetative productivity. Native plant diversity is likely to stabilize in the short term and increase in the long term.

There will be no effect on endangered species (Section 7 consultation evaluation form attached).

The overall effect on diversity of migratory birds will be positive as a result of the beneficial management effects on grasslands. Positive effects of grassland habitat management would be to improve the quality and quantity of upland bird nesting habitat. Also, improved forage conditions for wintering elk would result from effectively

managing grasslands. In years of treatment, ground nesting birds will be adversely affected by burning and grazing. The presence of livestock during nest initiation would tend to decrease the use of those sites by upland nesting waterfowl during the year of grazing. Delaying introduction of livestock to a particular tract until after nest initiation, has been shown to have minimal negative effects on nesting success.

The effects on recreation will be primarily related to the visual intrusion of livestock or machinery at certain times of the year. There will be no effects on cultural resources.

When grazing or haying is permitted, there will be an economic benefit to the permittee. Overall effects of this alternative on the area economy would be very small. The effect on refuge operating costs will be greater than the No Action Alternative but less than the Prescription Management - No Grazing Alternative. Rather than annually spending approximately $38,500 for mechanical management, grazing and haying would produce some positive economic benefits for the refuge in the form of AUM fees.

1. Conclusion. The overall beneficial effects on upland habitats and the wildlife using that habitat, that will be provided by the Prescription Management - Including All Tools Alternative justifies its selection as the preferred alternative. Prescribed grazing and fire would more closely imitate the natural ecological processes of natural grasslands than would mechanical manipulations. Implementation of this alternative would be much more cost effective than the Prescription Managment - No Grazing Alternative and provide greater habitat benefits than the No Action Alternative. All Refuge goals and objectives can best be achieved by implementation of this alternative that is compatible with the major purposes for which this refuge was established.

Rest in of itself represents a management strategy (i.e. tool). Long term rest would result in plant succession advancing towards representative climax species. Within most refuge grassland areas, these climax species are represented by a predominant shrub community characterized by black greasewood and sagebrush species. Long term rest also results in an increase of invading plant species such as noxious weeds. Consequently, long term rest results in degradation of wildlife habitat which leads to less species diversity and hence the need for management action. The most effective use of long term rest on the refuge would be in the riparian areas where the nonuse of other management tools would result in the desired management goals. Long

term rest in riparian areas enhances critical riparian areas supporting cottonwoods, willows, and associated woody understory (Hansen 1994).

There are only two instances when grazing would be the preferred management tool: in the removal of excess residual grass in areas that are in close association with riparian areas and in controlling noxious weeds. It is recognized that prescribed fire should not be utilized in grasslands associated with riparian areas due to the susceptibility of desirable woody plant species, such as cottonwoods and willows, to long term damage caused by fire. Dormant season livestock grazing over a short period of time (two weeks or less) would have fewer negative impacts on a cottonwood community than would prescribed fire. Livestock grazing in this instance would be the preferred management tool.

In most instances, fire increases the stem density of noxious weeds where grazing does not seem to produce this same effect. Therefore, grazing would be the preferred management tool, on an experimental basis, to attempt to exact control over noxious weeds. Limited growing season grazing will be implemented on an experimental basis in an attempt to control giant whitetop. The impact of grazing will be closely monitored to evaluate the response by wildlife and the impact upon giant whitetop.

Chemical application of pesticides utilizing an integrated pest management approach (chemical use in concert with mechanical mowing and/or burning) will continue to be utilized in an attempt to control noxious weeds such as Russian knapweed and leafy spurge.

Prescribed fire would be used more often in this option than with the other alternatives. Of all management tools considered, prescribed burning serves to accomplish most grassland management goals and objectives. Prescribed fire is the most effective way to reduce the invading shrub component and thereby set back successional stages. Livestock grazing cannot accomplish this goal.

In terms of ecosystem management, fire could be utilized to maintain a variety of successional stages to promote species diversity. Without management intervention (i.e. during periods of long term rest), plant succession in this mixed desert shrub zone (also known as a sagebrush or submontane shrub zones) will advance toward representative climax species such as black greasewood and sagebrush (Baker and Kennedy 1985). Prescribed fire is the most effective management tool for reducing invading climax shrubs, such as black greasewood and silver sagebrush. Reducing these shrub species would open areas to more desirable grassland species

that would be beneficial to wildlife as forage and nesting habitat. Domestic livestock grazing is not effective in reaching this management objective in that grazing results in a decrease in wheatgrass, bluegrass, and wildrye species, Indian ricegrass, and needle-and-thread and an increase in shrubs, herbs, and exotic cheatgrass (Baker and Kennedy 1985). Christensen and Welsh (1963) reported that domestic livestock grazing is capable of converting a naturally occurring Great Basin Grassland association to solid sagebrush in as little as seven years of grazing. Within the Great Basin Grassland association, livestock may also enable the establishment of annual exotic weeds (Christensen and Welsh 1963). Prescribed fire is also the most effective tool in removing residual vegetation when it becomes so dense as to insulate the soil and block light penetration, thereby choking out new growth.

Prescribed burning would be conducted under the constraints of Service policy and the refuge Fire Management Plan. Wildfires would be suppressed to prevent loss of refuge facilities, cultural resources, cottonwood galleries, and private and public resources on adjacent lands.

V. CONSULTATION AND COORDINATION

Input on the management alternatives was solicited from a variety of sources. Contacts were made with a variety of agencies, non-government organizations, local governments, and individuals to solicit comments. The final environmental assessment was developed after review of comments and recommendations received.

A news release was sent out on June 1, 1994 to 35 individuals, organizations, and newspapers soliciting comments and input regarding management alternatives. The public comment period was June 1 - July 8, 1994. The news release also announced an upcoming public meeting.

A public meeting was held on June 15, 1994 at the Lodore Hall on Browns Park National Wildlife Refuge. The meeting was attended by 19 area residents.

Twelve comments and recommendations were received concerning the upland management alternatives. All parties that responded were in favor and supported the Prescription Management - Including All Tools Alternative.

Management Alternative	Description	Soils	Water	Vegetation	Wildlife	Econ/Social	Cultural Resources
No Action	Continue annual dormant season grazing on 3,643 acres (1340 AUMs of 3350 total AUMs available); continue spot treatment of noxious weeds only by mechanical mowing and chemical treatment; prescribed burning to control emergent marsh vegetation	Amount of bare soil would remain same or increase slightly; minimal erosion on most sites; some erosion exists due to grasslands not having maximum potential plant density or composition	Remain unchanged and unaffected	Grasslands would continue to deteriorate due to loss of species diversity and continuing successional advancement toward climax shrub component; negative impacts by dormant season grazing includes browsing and grazing of riparian vegetation; excessive loss of residual cover	Decreased use by migratory birds due to a decrease in nesting cover; wildlife-livestock conflict with wintering elk during moderate and severe winters.	Remain unchanged and unaffected	Remain unchanged and unaffected

Management Alternative	Description	Soils	Water	Vegetation	Wildlife	Econ/Social	Cultural Resources
Prescription Management - No Grazing	Technology in the form of machinery, prescribed fire, and chemicals would be used as needed to rejuvinate, stimulate, and reseed grasslands; no grazing would be allowed	Soil compaction would increase due to mechanical equipment; short term soil erosion would increase due to soil exposure to wind and water during mechanical treatments; long term soil erosion would decrease due to increased plant population density and growth	Remain unchanged and unaffected	Not all grasslands would receive treatment due to limitations of other management tools within certain areas; most grasslands would improve in terms of species diversity	Increase use by migratory birds due to increased nesting cover and improved habitat conditions in most grassland habitats; no wildlife-livestock conflicts	Negative impact on local economy due to loss of grazing as an economic use; significant increase in refuge operating costs	Remain unchanged and unaffected

Management Alternative	Description	Soils	Water	Vegetation	Wildlife	Econ/Social	Cultural Resources
Prescription Management - Includes All Tools (Preferred Alternative)	All management tools, including rest, prescribed fire, grazing, and technology would be considered in grassland management; not more than 10-20% of total grassland acreage would be impacted annually	Long term reduction in erosion due to increased plant population density and growth following treatment	Long term increase in quality due to reduction of soil erosion	All grasslands would receive treatment to achieve goals and objectives; grasslands would improve in terms of species diversity	Increased use by migratory birds due to increased nesting cover and improved habitat conditions in all grassland habitats; no wildlife-livestock conflicts	Moderate negative impacts to local economy due to limited livestock grazing	Remain unchanged and unaffected

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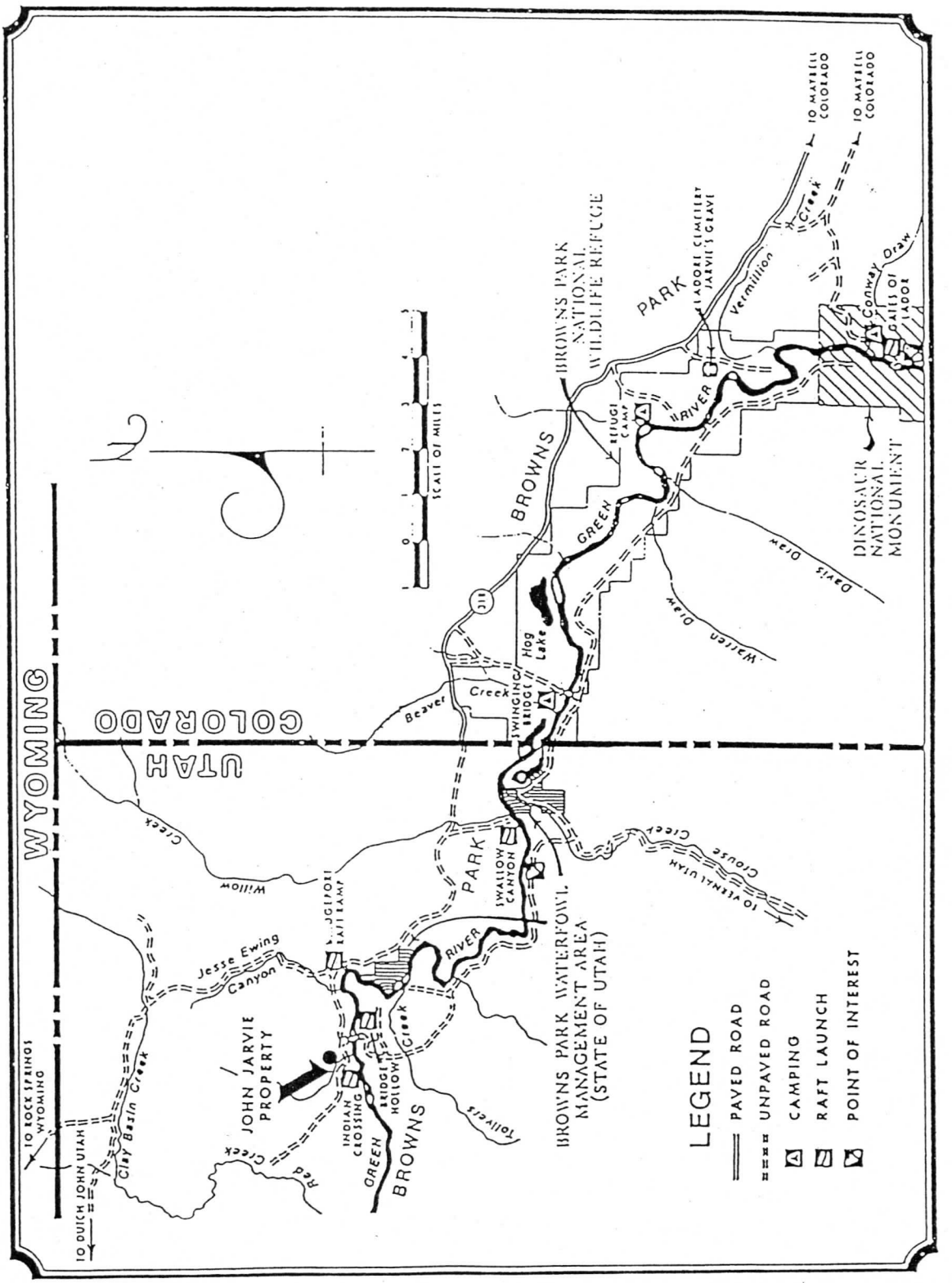
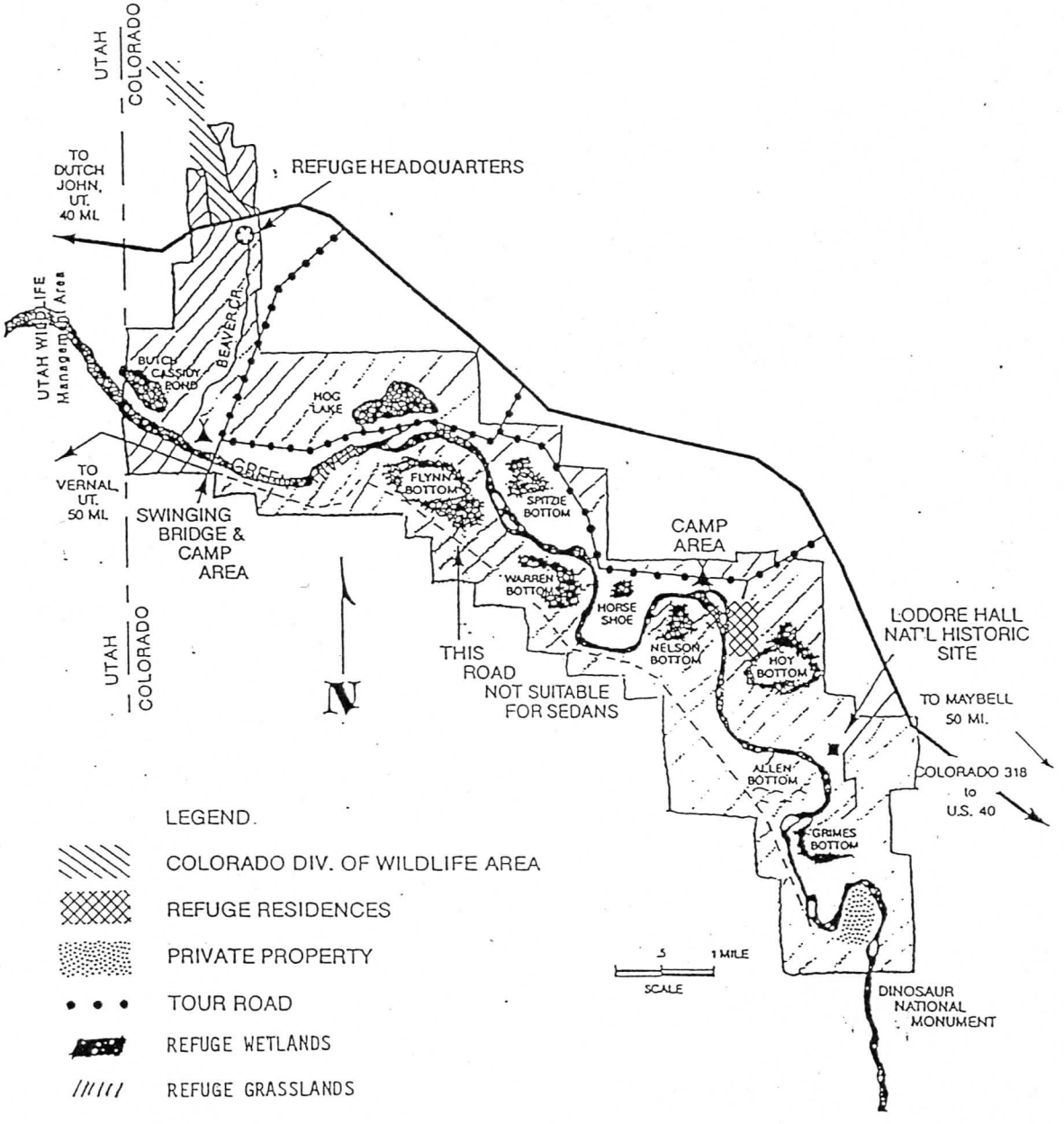
APPENDIX A

Location of Browns Park National Wildlife Refuge



APPENDIX B

Vegetation Map of Browns Park National Wildlife Refuge



APPENDIX C

Compatibility Determination

Station Name: Browns Park National Wildlife Refuge

Date Established: August 20, 1963

Establishing Authority:
Migratory Bird Conservation Commission

Purpose for which Established:
"...for use as an inviolate sanctuary, or for any other management purpose for migratory birds." (16 U.S.C. 715d (Migratory Bird Conservation Act))

"...suitable for - (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species..." (16 U.S.C. 460k-1 (Refuge Recreation Act)).

Description of Proposed Use:
Livestock grazing, haying and prescribed burning on Browns Park National Wildlife Refuge

Anticipated Impacts on Refuge Purposes:
Improve and protect refuge native grasslands and upland habitat. Provide residual grass cover for nesting waterfowl. Provide forage for wintering elk herds.

Determination: (Check one)

This use is compatible _X_ **This use is not compatible** ___

The following stipulations are required to ensure compatibility:

All management of refuge grasslands to improve upland habitat will be by prescription. Monitoring plans will be prepared to observe the condition of refuge habitat and the wildlife response to management actions. When monitoring indicates an action is needed on a tract to improve habitat conditions, prescriptions will describe what the problems are in the tract, what the objectives are for the management action, which tools will be used

to achieve the objectives, and a monitoring schedule to track the effect of the action. The tools to be considered include grazing, haying, prescribed burning, rest, and technology. No more than 10-20% of uplands will be impacted annually.

Justification: See Environmental Assessment

Prepared by: Jerre L. Gamble, Refuge Manager Jerre L. Gamble 07/07/94
(Name/Title/Signature/Date)

Reviewed by: Barnet W. Schranck, Refuge Supervisor Barnet W. Schranck 9/2/94
(Name/Title/Signature/Date)

Concur: Wilbur N. Ladd, Assistant Regional Director (RW) Wilbur N. Ladd 9/10/94
(Name/Title/Signature/Date)

Supporting Documents Attached 4

APPENDIX D

ENDANGERED SPECIES ACT - **SECTION 7**

INTRA-SERVICE CONSULTATION PROJECT EVALUATION FORM

1. Region 6

2. Browns Park National Wildlife Refuge, 65550, FY94

3. Programs: Upland Habitat Management: grazing, haying, prescribed burning.

4. Listed species or critical habitats concerned: Bald Eagle, Peregrine Falcon, Colorado Squawfish, Bonytail Chub, Humpback Chub, and Razorback Sucker.

5. Name and description of project: Browns Park National Wildlife Refuge Upland Habitat Management.

6. Location: The refuge is located 53 miles northwest of Maybell, Colorado along state highway 318. The refuge lies along both sides of the Green River and contains a total of 13,455 acres of river bottomlands and adjacent uplands.

7. Objectives of the action: All management of refuge uplands would be conducted according to written prescriptions (plans) to improve habitat conditions to achieve refuge purposes and objectives. Management of uplands would include the use of all tools available. These include the use of rest, livestock grazing, haying, prescribed burning, chemicals, and mechanical technology to improve grassland conditions. A monitoring plan would be prepared to observe the condition of refuge habitat and the wildlife response to management actions. When monitoring indicates that management actions are needed on a tract to improve habitat, in order to better accomplish the refuge purposes and objectives, a plan (prescription) will be prepared.

8. Explanation of impacts of action on listed species or their critical habitats: Bald eagle use on the refuge is limited to the riparian areas and only occurs during the winter months. Peregrine falcons are not dependent on upland grasslands and would be unaffected by grassland management practices. The four species of endangered fish found on the refuge are limited to the Green River and would not be affected by the proposed

upland management practices.

9. Identification of impacts of action on listed species or their critical habitats: No impact.

10. Previous consultations on this or relative action/ activities: Section 7 Consultation completed in March 1994 on the four endangered fish species (no impact, Dr. Tim Moode, Colorado River Fishery Project)

11. Conclusion: (cross-out one)
~~a. May Affect~~
b. Will Not Affect

12. Recommendations: Implement the Prescription Management - Including All Tools Alternative for Upland Habitat Management. All refuge goals and objectives can best be achieved by implementing of this alternative which is compatible which is compatible with the major purposes for which this refuge was established.

13. Biological assessment: All grasslands would receive prescribed treatments that would promote the health and vigor of grasslands and the wildlife they support. None of the aforementioned endangered species are directly dependent on the refuge grasslands. The prescribed grassland management activities would not negatively impact these endangered species.